

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

- 1 1. (currently amended) A fuel cell power plant (10) for
2 generating electrical energy from a process oxidant
3 stream (53, 42, 28) and a reducing fluid stream (26),
4 the plant comprising:
5 a) at least one fuel cell (12) for producing the
6 electrical energy from the process oxidant stream (53,
7 28) and the reducing fluid stream (26), and providing
8 a fuel cell exhaust stream (48) containing moisture
9 and sensible heat;
10 b) an energy recovery device (32) having first and
11 second gas flow channels (44, 42) separated by a
12 respective enthalpy exchange barrier (46), the fuel
13 cell exhaust stream (48) connected to pass through the
14 first gas flow channel (44) and a source of process
15 oxidant (30) for the process oxidant stream (53)
16 connected to pass through the second gas flow channel
17 (42), thereby to allow mass and heat transfer between
18 the gases in the first and second gas flow channels via
19 the enthalpy exchange barrier; ~~and~~
20 c) a supply of liquid medium (66); and
21 d) ~~injection~~ means (58, 60) ~~for~~ disposed to
22 injecting the a liquid medium (66, 64) substantially
23 directly into the process oxidant stream (53)
24 preparatory to the process oxidant passing through the
25 energy recovery device second gas flow channel (42) for
26 regulating the transfer of mass and heat between the
27 fuel cell exhaust stream (48) and the process oxidant
28 stream (53, 42).

1 **2.** (original) The fuel cell power plant (10) of claim 1
2 wherein the energy recovery device includes an inlet
3 (54) for receiving the process oxidant stream (53) to
4 pass through the second gas flow channel (42), the
5 liquid medium for injection is water, and the
6 injecting~~en~~ means (58, 60) is positioned to inject the
7 water into the process oxidant stream (53) immediately
8 upstream of said inlet (54).

1 **3.** (original) The fuel cell power plant (10) of claim 2
2 including a plenum (62) located immediately upstream of
3 said inlet (54), said process oxidant stream (53) flows
4 through said plenum (62), and wherein the injecting~~en~~
5 means (58, 60) is operative to inject water (66, 64)
6 into the plenum (62) for intimate mixing with and
7 humidification of the process oxidant stream.

1 **4.** (original) The fuel cell power plant of claim 2
2 wherein the injecting~~en~~ means comprises one or more
3 spray nozzles (60) disposed to inject a spray of water
4 (66, 64) into the plenum (62).

1 **5.** (original) The fuel cell power plant (10) of claim 3
2 wherein the injecting~~en~~ means comprises one or more
3 spray nozzles (60) disposed to inject a spray of water
4 (66, 64) into the plenum (62).

1 **6.** (original) The fuel cell power plant (10) of claim 1
2 including control means (70, 74, 78, 80, 84)
3 operatively associated with the injecting~~en~~ means (58,
4 60) for controlling at least the amount of the liquid
5 medium (66, 64) being injected.

1 **7.**(original) The fuel cell power plant (10) of claim **6**
2 wherein the control means (70, 74, 78, 80, 84) include
3 at least one or the other of a temperature sensor (80)
4 for sensing the temperature of ambient process oxidant
5 and a humidity sensor (84) for sensing the moisture
6 content of the ambient process oxidant.

1 **8.** (original) The fuel cell power plant (10) of claim **7**
2 wherein the control means (70, 74, 78, 80, 84) includes
3 both the temperature sensor (80) and the humidity
4 sensor (84).

1 **9.** (original) The fuel cell power plant (10) of claim **1**
2 wherein the enthalpy exchange barrier (46) of the
3 energy recovery device (32) comprises a fine-pore
4 support matrix.

1 **10.** (original) The fuel cell power plant (10) of claim
2 **9** wherein the fine-pore support matrix is one or a
3 combination selected from the group consisting of
4 porous graphite layers; porous graphite-polymer layers,
5 inorganic-fiber thermoset polymer layers, glass fiber
6 layers, synthetic-fiber filter papers treated to be
7 wetable, porous metal layers, and perforated metal
8 layers with particulate material in the pores.

1 **11.** (currently amended) In a fuel cell power plant (10)
2 for generating electrical energy from a process oxidant
3 stream (53, 42, 28) and a reducing fluid stream (26),
4 the plant comprising a fuel cell (12) for producing the
5 electrical energy from the process oxidant stream (53,
6 28) and the reducing fluid stream (26), and providing
7 a fuel cell exhaust stream (48) containing moisture

8 and sensible heat; and an energy recovery device (32)
9 having first and second gas flow channels (44, 42)
10 separated by a respective enthalpy exchange barrier
11 (46), the fuel cell exhaust stream (48) connected to
12 pass through the first gas flow channel (44) and a
13 source of process oxidant (30) for the process oxidant
14 stream (53) connected to pass through the second gas
15 flow channel (42), thereby to allow mass and heat
16 transfer between the gases in the first and second gas
17 flow channels via the enthalpy exchange barrier, the
18 method comprising:
19 dispensing water (66, 70, 74, 60, 64) substantially
20 directly into the process oxidant stream (53)
21 preparatory to the process oxidant passing through the
22 energy recovery device second gas flow channel (42) for
23 regulating the transfer of mass and heat between the
24 fuel cell exhaust stream (48) and the process oxidant
25 stream (53, 42).

1 **12.** (original) The method of claim 11 wherein the step
2 of dispensing water (66, 70, 74, 60, 64) into the
3 process oxidant stream (53) comprises monitoring (80,
4 84, 90) one or more parameters of the fuel cell power
5 plant (10), including the process oxidant stream (53,
6 42, 28), and controllably injecting water into the
7 process oxidant stream (53) in response to the one or
8 more of the monitored parameters.

1 **13.** (original) The method of claim 12 comprising the
2 steps of monitoring (80) the temperature of the process
3 oxidant stream (53), and injecting water (66, 70, 74,
4 60, 64) into the process oxidant stream when the
5 temperature exceeds a threshold, thereby to cool and
6 humidify the process oxidant stream (53, 42) to inhibit

7 dry-out of the enthalpy exchange barrier 46 in the
8 energy recovery device 32.

1 14. (currently amended) The method of claim 13 wherein
2 the temperature threshold is higher than~~in the range of~~
3 about 85° F and lower than about~~to~~ 90° F.

1 15. (currently amended) The method of claim 12 wherein
2 the operating status of the power plant (10) is
3 monitored (70, 80) to identify at the condition of start-
4 up condition, and injecting water (66, 70, 74, 60, 64)
5 into the process oxidant stream upon start-up, at least
6 after a shutdown exceeding a predetermined duration,
7 for assuring sufficient wetting of the enthalpy
8 exchange barrier (46) during start-up.

1 16. (original) The method of claim 15 wherein a
2 temperature of the power plant (10), including the
3 inlet temperature of the process oxidant stream (53,
4 42, 28), is monitored (80) to detect a freezing
5 condition, and controllably (70, 78) injecting heated
6 water (66, 58, 60, 64) during start-up in response to
7 detection of a freezing condition to defrost at least
8 the energy recovery device 32.

1 17. (currently amended) The method of claim 12 wherein
2 the fuel cell power plant (10) includes a coolant
3 system (38, 88) having a coolant, the coolant having a
4 level, and including the steps of monitoring (90) the
5 level of coolant in the coolant system (38, 88) and
6 injecting water (66, 58, 70, 74, 78, 60, 64) into the
7 process oxidant stream when the coolant level exceeds a
8 threshold, thereby to raise the dew point of the
9 process oxidant stream (53, 42) to inhibit recovery of

10 water from the fuel cell exhaust stream 48 via the
11 enthalpy exchange barrier 46 to the process oxidant
12 stream (42).